

## Product Information

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Descri	ntion
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 $3M^{\text{\tiny M}}$  Glycidyl Azide Polymer GAP-5527 Polyol is an energetic, hydroxyl-functional liquid polymer which can be cured into an elastomeric polyurethane with conventional polyisocyanates.

## **Applications**

This material, because of its higher molecular weight and functionality, can provide the capability for better mechanical properties than lower molecular weight GAP diol. GAP materials exhibit a much higher burning rate than conventional binders. Potential applications are binders for solid rocket propellants, explosives and pyrotechnics. GAP may be particularly useful in formulating high energy propellants that are safer to store and handle, and in the formulation of low signature propellants.

## Typical Properties

Not for specification purposes

Appearance	Amber liquid
Viscosity (at 25°C)	12,000 cps
Density	1.3 g/ml
Hydroxyl equivalent weight	2000
Water content	0.02%
Heat of formation	+33 Kcal/100 g mole (estimated)

## Elemental composition

Nitrogen	42.0%
Carbon	36.5%
Oxygen	16.5%
Hydrogen	5.0%

Thermogravimetric analy	sisNo	weight loss to	over 200°C.

$(10 \text{ mg}, 10^{\circ}\text{C/min})$	Onset of decomposition at 235-240°C
	Complete by about 260°C

Complete by about 200

Solubility	Niost organic solvents, but not water,
	lower alcohols or aliphatic hydrocarbons.

Glass transition temperature ......Unplasticized polyurethane gumstocks made to

date exhibit glass transition near -35°C. Plasticizer can be used to lower the glass

transition temperature.

Functionality .....Between 2.5 to 3 hydroxyl groups per molecule

Reactivity ......Gumstocks with 1:1 NCO-OH typically require added catalyst to allow curing at 135°F in a

reasonable time.

Hazardous Properties	3M <sup>™</sup> GAP-5527 Polyol is classified by the Department of Transportation as "Propellant, Liquid, UN 0495", and by the Department of Defense as a Class 1.3 Explosive, Storage Group C, on the basis of the following test results:
	Impact test (Bureau of Explosives) 0/10 at 80 inch-pound neat
	Friction test (Bureau of Explosives)0/10 at 100 pounds
	Unconfined burnSmooth, rapid burn (under 1 second for 185 grams) #8 blasting cap. Neat material did not react. Cotton soaked with GAP-5527 ignited and burned.
	Thermal stabilityPass, no reaction at 75°C for 48 hrs.
	Mixtures of GAP-5527 with other materials may have a much higher sensitivity than the pure material and it is critical that any such mixture be characterized for hazardous properties before any significant quantities are mixed.
Shipping	Ship in accordance with DOT Regulations.
Product Safety and Handling	3M <sup>™</sup> GAP-5527 polyol must be handled and stored in accordance with the regulations prescribed by the Bureau of Alcohol, Tobacco and Firearms and/or the Department of Defense as applicable to the user's facility.
	3M recommends storage at room temperature, and indications that shelf life of GAP-5527 in the original unopened containers is at least two years. GAP should not be exposed to sunlight or other strong UV sources as it will slowly evolve nitrogen gas. However, opaque containers may be exposed to sunlight.
	GAP has been found to pick up moisture from the atmosphere, and this moisture may interfere from the NCO-OH curing reaction. If the container has been left open for a time it may be necessary, before use, to dry the 3M GAP by agitated vacuum drying or by sparging with dry nitrogen at slightly elevated temperatures (60-70°C).
	For additional health and safety information, please refer to the product Material Safety Data Sheet.
Disposal	Testing of a solution of 40% GAP in ethyl acetate indicates that such solutions may be classified as a "flammable liquid." It should be possible to destroy such solutions in an approved incinerator.
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Important Notice to Purchaser: The information in this publication is based on tests that we believe are reliable. Your results may vary due to differences in test types and conditions. You must evaluate and determine whether the product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all express or implied warranties (including the warranties of merchantability or fitness for a particular purpose): 3M's only obligation and your only remedy is replacement of product that is shown to be defective when you receive it. In no case will 3M be liable for any special, incidental, or consequential damages based on breach of warranty or contract, negligence, strict tort, or any other theory.

